

IN THE CLAIMS:

1 - 20. (Canceled).

21. (Currently Amended) A method for monitoring movable parts of an industrial robot machine, the method comprising the steps of:

5 providing a reference value or a reference corridor to a reference curve generated by a calculated reference result using a mathematical model in a calculation or by recording real measure values under known conditions without any interfering influences for the movable parts of the machine;

measuring physical material strains on parts of the machine by sensors or transducers arranged on the robot to arrive at a measured quantity;

10 comparing said measured quantity with said reference value prior to transforming into an actual measured value of said measured quantity; and

comparing said actual measured value of said measured quantities and/or calculated measured results with said reference value, whilst taking account of tolerances to arrive at a comparison result, wherein physical material strains on parts of the machine are measured as at least one measured quantity and wherein actual measured values of measured quantities  
15 resulting from transformations of the measured quantities are compared with reference values; [[the]] said comparison result giving produces information about either interference freedom or an unexpected event, including a collision.

22. (Currently Amended) A method for monitoring movable parts of an industrial robot machine according to claim 21, wherein measured values of at least two different physical quantities are measured values of at least two different measured quantities are detected and at least one of these measured values is processed to a first measure result in such a way that it is comparable with another measured value of another measured quantity or a second measure result obtained as a result thereof, that [[the]] said first measure result is compared with said another measured value of said another measured quantity or [[the]] said second measure result obtained as a result thereof and that a signal characterizing [[the]] said comparison result is provided.

23. (Currently Amended) A method according to claim 21, wherein [[the]] said material strains are measured by means of at least one transducer.

24. (Currently Amended) A method according to claim 21, wherein [[the]] said material strains are measured by means of a strain gauge.

25. (Currently Amended) A method according to claim 21, wherein [[the]] said material strains are measured by means of piezoelectric or light guide-based pickups.

26. (Currently Amended) A method according to claim 21, wherein [[the]] said material strains are measured by means of a set of transducers positioned on at least two

surfaces of a robot part.

27. (Cancelled).

28. (Currently Amended) A method according to claim [[27]] 21, wherein said tolerances are taken into account by forming [[a]] said reference corridor to [[a]] said reference curve.

29. (Currently Amended) A method according to claim 21, wherein in the case of divergences from expected measured said reference values and/or calculated measured results, the machine is stopped or brought into a safe state.

30. (Currently Amended) A machine with movable parts for an industrial robot, the machine comprising:

having measured a plurality of measuring devices for determining physical material strains; and

5            a comparison device for comparing actual measured values and/or calculated measure results with an expected reference value of predetermined models for robot movements, whilst taking account of tolerances, wherein said reference value or a reference corridor to a reference curve is generated by calculation using a mathematical model or by recording real measure values under known conditions without any interfering influences, [[the]] an output of [[the]]

10 said comparison device giving information about either an interference from movement freedom or an unexpected event including a collision.

31. (Currently Amended) A machine according to claim 30, wherein at least two said measuring devices are provided for determining said material strains and a comparison device for comparing actual measured values and/or calculated measure results with predetermined models for robot movements, and a plurality of said measured value of at least two different  
5 measured quantities are detected and at least one of these measured values is processed to a first measure result in such a way that it is comparable with another measured value of another measured quantity or a second measure result obtained as a result thereof that said first measure result is compared with said another measured value of said another measured quantity or said second measure result obtained as a result thereof and that a signal characterizing said  
10 comparison result is provided and [[the]] said output of [[the]] said comparison device giving information about an unexpected event including a collision.

32. (Currently Amended) A machine according to claim 30, wherein [[the]] said devices for determining materials strains are constructed as transducers.

33. (Currently Amended) A machine according to claim 30, wherein [[the]] said devices for determining material strains are constructed as strain gauges.

34. (Currently Amended) A machine according to claim 30, wherein ~~[[the]]~~ said devices for determining material strains are constructed as light guide-based pickups.

35. (Previously Presented) A machine according to claim 30, wherein in each case at least one device for determining material strains is placed on at least two surfaces of a robot part.

36. (Currently Amended) A machine according to claim 30, ~~characterized by~~ wherein a monitoring device is provided to which is connected at least one device for determining material strains on machine parts.

37. (Currently Amended) A machine according to claim ~~[[35]]~~ 36, wherein ~~[[the]]~~ said monitoring device has a unit~~[[s]]~~ for monitoring at least elongations of ~~[[the]]~~ said machine structure and another unit for monitoring a further measured quantity.

38. (Currently Amended) A machine according to claim 37, wherein ~~[[the]]~~ said monitoring device has a device for disconnecting ~~[[the]]~~ said machine.

39. (Currently Amended) A method machine according to claim ~~[[21]]~~ 30, wherein in the case of divergences from expected measured said reference value~~[[s]]~~ and/or calculated measure results, the machine is stopped or brought into a safe state.

40. (Cancelled).